

ENVIRONMENTAL MONITORING STUDY  
SOUTHERN CALIFORNIA CHEMICAL CO.  
SANTA FE SPRINGS, CALIFORNIA

JUNE 1985

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**J. H. KLEINFELDER & ASSOCIATES**  
GEOTECHNICAL CONSULTANTS • MATERIALS TESTING  
LAND AND WATER RESOURCES



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May 13, 1985

Q-1014-1

Southern California Chemical Co., Inc.  
8851 Dice Road  
Santa Fe Springs, CA 90620

Attention: Ms. Tere King

Dear Ms. King:

Attached to this is letter is our report entitled "Environmental Monitoring Study, Southern California Chemical Company, Santa Fe Springs, California". The report presents a summary of the field exploration, laboratory testing, and analysis prepared during investigation.

We trust the information presented in the report meets your needs at this time. Should you have any questions regarding the report please feel free to contact us at your convenience.

Very Truly Yours,

J. H. KLEINFELDER & ASSOCIATES

Kenneth L. Durand  
Hydrogeologist

Randolph C. Harris  
Senior Hydrogeologist

KLD:RCH:pb

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ENVIRONMENTAL MONITORING STUDY  
SOUTHERN CALIFORNIA CHEMICAL CO.  
SANTA FE SPRINGS, CALIFORNIA

## 1.0 INTRODUCTION

Southern California Chemical Company has been located at its present address for over 25 years. The Southern California facility manufactures inorganic chemicals for plating, printed circuitry, water treatment and agriculture uses. Chemicals used on site include copper sulfate, copper chloride, zinc sulfate, nickel and ferric chloride.

This report summarizes the work and findings of the environmental investigation at the Southern California Chemical Company facility in Santa Fe Springs, California. A site specific plan showing the study area is presented on Plate No. 2. The work has been coordinated with Ms. Tere King of Southern California Chemical Company, Santa Fe Springs, California.

A regional site plan illustrating the facility's location is presented on Plate No. 1 of the Appendix. The purpose of the investigation was to respond to the requests of the Los Angeles Regional Water Quality Control Board and the Department of Health Services concerning monitoring of the steel re-inforced concrete wastewater pond per RCRA requirements.

## 2.0 AUTHORIZATION

The work on this project was authorized by Ms. King in a contract



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dated November 29, 1984.

### 3.0 SCOPE OF WORK

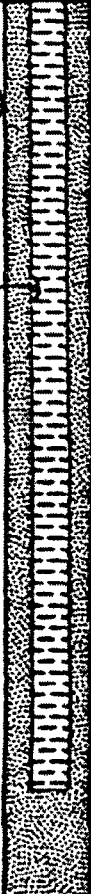
The scope of work on this project is outlined in our proposal dated November 26, 1984 as modified by the Regional Board in a letter dated December 11, 1984. The scope of work was developed through communication with Mr. Hank Yacoub and Mr. Athar Khan of the Los Angeles Region of the Regional Water Quality Control Board (RWQCB), and our understanding of the RCRA requirements. Specific work scope items included are summarized in the following:

- o Drilling, sampling, and logging 7 soil test borings to a maximum depth of 90 feet.
- o Completing all seven of these borings as monitoring wells.
- o Sampling the water from each monitoring well.
- o Reviewing relevant literature.
- o Evaluating the collected data.
- o Preparation of a report.

### 4.0 FIELD INVESTIGATION

#### 4.1 Soil Boring/Sampling

A total of 7 soil test borings were drilled. The locations are shown on Plate 2 in the Appendix. The original work plan proposed that all wells would be drilled by the continuous flight hollow stem auger method.

DEPTH (feet)	Blow Count	Sample	USCS	Description	Well Const.
60	52/6	1	SW	sand, med.-fine, white, v. dense wet	
65					
70					
75					
80				Boring terminated at 80 feet (El± 69.5 ft) Date of drilling was 1-22-85 elevation of well head 149.46ft materials logged by J. Friedman	

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So. Calif. Chemical  
Santa Fe Springs

PLATE

10

PREPARED BY: JF DATE: 5/85

CHECKED BY: DATE:

LOG of BORING 6B

PROJECT NO. 1014-1

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Due to artesian groundwater conditions, the use of hollow stem equipment beneath 45 feet was impossible. With the concurrence of the RWQCB the borings were drilled by the hollow stem auger method for the upper 45 feet then converted to the mud rotary method for the remainder of the hole. The augers, drill rod, and drill bits were steam cleaned prior to use and between borings to minimize the potential for cross contamination. The drilling was performed by Datum Exploration under the observations of a J. H. Kleinfelder staff geologist who visually logged the borings and classified the soils. The boring logs are presented on Plate Nos. 4 through 10 in the Appendix. Plate No. 3 illustrates the Unified Soils Classification System used to classify the soils encountered.

Soil samples were collected during the drilling operation at approximately 5 foot intervals in the unsaturated zone and then at stratigraphically significant intervals once groundwater was encountered. A modified Porter Sampler was used to collect samples. Soil samples were collected for both laboratory analysis and for visual classification of soil types. All retained soil samples were collected in brass sampling tubes, sealed with aluminum lined caps, labeled, and delivered to Brown and Caldwell Laboratories, Pasadena, California for chemical analysis, with the appropriate chain of custody form. Copies of the chain of custody forms are included in the Appendix.

#### 4.2 Monitoring Well Construction/Development

The seven soil test borings were completed as monitoring wells.

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Wells were constructed with 2 inch diameter PVC pipe and 0.020 inch machine slotted screen. The screened section annulus was packed with clean sand and a bentonite plug was placed above the sand pack. The remaining annulus was cemented from the plug up to the surface. No solvents or glues were used during the well construction. The details of each individual well completion are shown on each respective boring log.

Each well was finished with either an aluminum well head box with a moisture and tamper resistant lid or a locking steel cased well protector. The well head boxes are set 1 to 2 inches above ground level, with a finished cement apron to minimize the potential for entrance of surface fluids. A 3 foot high well protector was used on MW-5 to prevent contamination of this well during flooding conditions.

After installation, the wells were developed with an air lift developing tool equipped with a foot valve to prevent the introduction of air into the formation. The wells were pumped until the water was relatively clear.

#### 4.3 Water Sampling

All wells were measured for static water level prior to sampling. The wells were then purged and sampled using an air activated submersible pump (bladder pump) constructed of stainless steel and viton. To minimize the potential for cross-contamination, the pump and teflon sampler line were thoroughly decontaminated before sampling and between wells by the following procedure:

1. 5 gallons of clean tap water was pumped through the sample pump and sample lines.
2. The pump and was then disassembled, and the used bladder removed.
3. All parts were washed in distilled water and reassembled with a new bladder.
4. Sampler lines were purged with 5 to 10 gallons of clean tap water under pressure.
5. Two gallons of distilled water was pumped through the entire system.

Prior to sample collection, a minimum of five well volumes were purged from the well to collect a representative formation sample.

#### 4.4 Monitoring Well Elevation

The location and elevation of the monitoring wells were determined by a survey made by Combs/Rodriguez & Associates Land Surveying, Cerritos, California on March 15, 1985.

Table A presents the approximate well head elevations, depth to groundwater, and groundwater elevations of the 7 monitoring wells. Plate 11 is a generalized water level contour map of the uppermost water bearing zone beneath the site. As illustrated on the map, groundwater flow is to the south-southwest across the site with a mound near monitoring well Number 4.



TABLE A

WELL NUMBER	WELL HEAD ELEVATION	DEPTH TO WATER*	WATER LEVEL ELEVATION
MW-1	El. +152.26'	43.78'	El. +108.48'
MW-2	El. +151.56'	43.84'	El. +107.72'
MW-3	El. +151.62'	44.10'	El. +107.52'
MW-4	El. +149.76'	41.65'	El. +108.11'
MW-5	El. +153.21'	47.19'	El. +106.02'
MW-6a	El. +149.31'	29.92'	El. +119.39'
MW-6b	El. +149.46'	42.66'	El. +106.80'

\* Date of Measurement was 4-9-85

#### 5.0 LABORATORY TESTING

Laboratory testing for this project consisted of analyzing 12 soil samples, and 6 water samples. Water from MW-6A was not analyzed since the RWQCB concurred that the limited amount of water present in this well was not representative of the groundwater in this area. The soils were analyzed for the metals that have historically been used on the site. These metals are listed in Table C. The water samples were analyzed for: 1) The parameters that characterize the suitability of the groundwater as a drinking water supply as specified in CFR 40 part 265 Appendix III; 2) The parameters that establish the groundwater quality as specified in CFR 40 part 265.92 (b)(a); 3) The parameters used as indicators of groundwater contamination as specified in CFR 40 part 265.92 (b)(3); and 4) The compounds

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requested by DOHS and the RWQCB in their letter dated December 11, 1984. These parameters are listed in Table B.

The testing was performed at the laboratory previously listed in section 4.1. The results of the laboratory testing are summarized and presented in Tables D through G of the Appendix. Individual test results are included in Appendix B. All analysis was performed by procedures outlined in the 14th Edition of Standard Methods.

#### 6.0 QUALITY CONTROL

To monitor the precision and accuracy of the chemical data, the following quality assurance measures were employed:

1. Duplicate samples
2. Split samples
3. Trip blank testing
4. Cross contamination testing

Duplicate samples were taken at each sampling site. In the case of 40 ml VOA vials, four samples were obtained for each parameter as required in 40 CFR section 265.82(b)(3). This ensures that if breakage or trouble with the testing equipment occurs, there is a backup sample to test. This also allows a recheck on results if there is an inconsistency or if confirmation of results is necessary.

Trip blank (distilled water) were included by the laboratory to

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monitor quality control during transportation and testing of the samples. Split samples were provided to both the Regional Board and Southern California Chemical Company. Comparison of the results for chromium, the major chemical of concern, demonstrate the relative consistency of the data. The Regional Board's laboratory detected 520 ppm of total chromium. Brown and Caldwell detected 500 ppm of total chromium. Southern California Chemical Companies in house laboratory detected 520 ppm of total chromium in the groundwater. This consistence demonstrates a high level of confidence in the results.

In an effort to ensure the precision and accuracy of the data, quality control measures were employed to both minimize and measure cross-contamination potential.

To minimize cross-contamination between field samplings, the pump and sample lines are purged by the procedure detailed in Section 4.3. The total volume of pump and lines is less than one half gallon. The pumping results in 20 to 26 volumes of clean water being flushed through the system.

All samples were labeled during sampling and shipped refrigerated to Brown and Caldwell Laboratories, Pasadena, California. A chain of custody form was maintained for all samples taken. Copies of these forms are included in Appendix A.

## 7.0 GEOLOGY/HYDROGEOLOGY

### 7.1 Geology

Southern California Chemical Company's Santa Fe Springs facility is located in Section 31 of Township 2 South, Range 11 west (San Bernardino Base meridian), within the Santa Fe Springs Plain area of the coastal plain of Los Angeles County, California. The Santa Fe Springs Plains is a low, slightly rolling topographic feature that has been warped by the Santa Fe Springs-Coyote Hills anticlinal system. These plains dip gently both to the northeast toward Whittier and to the southwest toward the Downey Plains, with an elevation difference that ranges between 175 and 200 feet above sea level.

The site is located on upper Pleistocene alluvium of the Lakewood Formation. The Lakewood formation unconformably overlies the lower Pleistocene San Pedro formation, the Pliocene Pico and Repette formations, and the Miocene Puente formation. Beneath the site only the Lakewood and the San Pedro formations contain fresh water bearing units (Plate 12).

### 7.2 Hydrogeology

The site area is located on surface exposure of the Bellflower Aquiclude, a low permeability portion of the Lakewood formation. This late Pleistocene alluvial formation is approximately 15 to 20 feet thick and consists of clays, silts, silty clays and sandy clays at this location. The Gage Aquifer underlies this and is approximately 15 to 20 feet thick, consisting of fine to medium

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sands in this area. The literature (2) places the bottom of the Gage Aquifer at approximately 50 feet beneath the surface (Plate 13). It appears from On site borings indicate that the bottom of the Gage is actually at approximately 30 to 35 feet. All the borings drilled on site encountered a clay to silty clay layer beneath the Gage. This is most likely the top of the uppermost aquiclude of the San Pedro Formation. This aquiclude is approximately 15 to 25 feet thick and serves to separate the Gage Aquifer from the Jefferson Aquifer. Since the coefficient of permeability and the horizontal and vertical extent of this aquiclude are not well defined, its usefulness as a competent barrier between these two aquifers is presently unknown. The Jefferson Aquifer underlies this aquiclude and is the uppermost aquifer beneath the site. All water samples were obtained from this aquifer. The Transmissivity of this aquifer is on the order of 10,000 gallons per day per foot (2) beneath the site. Based on an assumed aquifer thickness of 40 feet and an error factor of  $1 \times 10^1$ , a permeability range of 2500 to 25 gal/day/ft<sup>2</sup> can be expected.

The general regional flow of groundwater in the area is to the south to southwest (3, 9). The water levels measured in the monitoring wells indicate a site-specific flow to the south-southwest. Plate 11 illustrates the approximate water level contours and flow direction based on the data generated during this study.

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The following production wells are located within a one mile radius of the site:

<u>State Well Number</u>	<u>Owner</u>
2S/11W - 29 E05	Apex Bulk Commodities Associates of Los Nietos
2S/11W - 30Q05	Mutual Water Owners Associates of Los Nietos
2S/11W - 30R03	City of Santa Fe Springs
3S/11W - 32J04	Whittier Union High School

The only chemical data available for the above wells is the General Mineral analysis for Well Number 2S/11W - 30R03. This analysis is included in Appendix A.

### 7.3 Usability of the Shallow Aquifers

The shallow aquifers of the area have been out of use for some time. The Los Angeles County Department of Health Services is the approval agency for water supply wells of this area. For many years they have required the upper 70 to 100 feet of all wells to be both cased and sealed. Additionally they are unaware of any public wells which use the water sources in question. (8)

The Los Angeles County Flood Control District stopped compiling data on the shallow aquifer in 1975 because they were out of use in the area at that time. (9)

### 7.4 Santa Fe Springs TCE Situation

One public well in the Santa Fe Springs area is presently shut-in

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due to the presence of TCE. The well is owned by Santa Fe Springs Water District and is located on Clarkman Street, north of Florence Avenue, 2 miles south of the Southern California Chemical Company facility (Plate 1). The perforations in that well begin at 150 feet, indicating that the TCE has migrated to at least that depth. (8) The important point is that this is one of the very few wells in the area to draw water from that shallow a depth. Unless the TCE source is local to that well, it would have taken a very long time for the compound to reach that depth. The 1980 TCE report for the San Gabriel Valley by the Los Angeles California Regional Water Quality Control Board, states that "since the use of TCE was significantly curtailed in 1966, there is a strong possibility that the present problem is a result of past industrial practices of some 15-30 years ago." (8) Because of the large number and long history of solvent users and handlers in the Santa Fe Springs area, it can be expected that as monitoring programs of the shallow groundwater develop in the area, a high general background level of TCE and other solvents will likely be encountered in the local area.

#### 7.5 Surface Water Features

Average rainfall for the Santa Fe Springs area is approximately 13 to 14 inches annually. Located 1/4 mile to the northeast is the Soresen Avenue storm drain. This concrete lined channel is the only surface water feature within one mile of the facility. The San Gabriel River is slightly over one mile west of the

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facility. The associated percolation basins are located 1 1/2 to 2 miles northwest of the site. Due to the semi-arid climate of Southern California, the streams are intermittent.

## 8.0 DISCUSSION

### 8.1 Soil Samples

Twelve soil samples were analyzed for the compounds listed in Table B. Sample digestion was by nitric acid, yielding values for Total Threshold Concentration Level. Analyses were performed on samples from the 10 and 30 foot depth of borings 1, 2, 3, 4 and 5. The 10 foot sample of 6A and the 30 foot sample of 6B were also analyzed. Table D presents the chemical results for Borings 1 thru 6. The California Assessment Manual (CAM), Total Threshold Limit Concentration (TTL) levels are also listed for comparative analysis.

The analysis indicates that copper is present in the soil at concentrations between 17 to 170 mg/kg. The CAM TTL for copper is 2500 mg/kg which is 15 times the maximum level detected in the soil. Chromium was detected at levels between 4.2 to 27 mg/kg. The TTL for chromium is 500 mg/kg which is approximately 20 times the maximum level detected. Nickel was detected at levels between less than 5 to 77 mg/kg. The CAM TTL is 2000 mg/kg which is 26 times the maximum level detected in the soil on the site. Zinc was detected at levels between 20 to 89 mg/kg in all the samples except the 30 foot sample of MW-2. The 30 foot sample of MW-2 had a zinc concentration of 860 mg/kg which is 10



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times the concentration detected in any other sample. However, this concentration is still one sixth the CAM TTLC limit of 5000 mg/kg. It is apparent that levels of nickel, chromium, copper and zinc above background levels exist in the soils beneath the facility. All these metals are however, below the CAM action levels.

### 8.2 Groundwater Samples

Groundwater samples were collected from wells 1 thru 5 and 6B between February 21 and March 12, 1985. With concurrence of Water Board personnel, well 6A was not sampled because it did not produce a usable quantity of water. Representatives of the Regional Board and Southern California Chemical Company were present during sampling and were provided split samples when requested.

Analyses of the water from the 6 monitoring wells are presented in Tables E thru Table G. The appropriate State or Federal Standard for each parameter is listed for comparison. All substances except for the following were below the applicable standards. Cadmium was detected in MW-4 at 0.78 mg/l. Chromium (Hexavalent) was detected at 500 mg/l in MW-4. Nitrate, both as  $\text{NO}_3$  and N was detected in MW-4 at 81 mg/l and 18 mg/l respectively. Chloride was also detected in MW-4 at 2300 mg/l. Manganese was detected in 5 of the 6 wells at levels between 7.5 and 0.53 mg/l. Specific Conductance was also detected above drinking water standards in 5 of the 6 wells.

It is evident from the data that groundwater contamination has occurred in the vicinity of Monitoring Well #4. Possible sources include surface spillage (prior to Southern California Chemical Company's extensive concrete paving), the waste water pond, and a suspected leaking hexavalent chromium underground storage tank which was removed over ten years ago. Based upon the data obtained so far and Southern California Chemical Company's records, the most probable source of contamination is the suspected leaking underground storage tank. Precise definition of the source(s) and extent of the contamination can only come from further testing and analysis.

### 8.3 Water Analyses By The Regional Board Water

The split groundwater samples that were provided to the Regional Water Quality Control Board were analyzed by the Department of Health Services, Southern California Laboratory. In addition to analyzing for the substances agreed to in the work plan, DOHS analyzed for a number of organic chemicals. Their unconfirmed analysis indicated elevated levels of Toluene, Xylene and a number of other organic chemicals in the groundwater. Southern California Chemical Company's records indicate that none of these chemicals has ever been used on-site, even in laboratory quantities. Although the source of these chemicals is unknown, there are several companys using these chemicals which directly adjoin and are apparently up-gradient from Southern California Chemical Company's property.

#### 9.0 CONCLUSIONS

The following general conclusions can be drawn from the foregoing data. Future studies may add to, and/or change these conclusions.

1. A confined aquifer exists beneath the site with a potentiometric surface between approximately 42 to 47 feet below ground level.
2. The general direction of groundwater flow is to the south-southwest.
3. Relatively low permeability soils were encountered from the surface to approximately 10 feet below ground surface. A second low permeability zone was encountered at approximately 25 to 50 feet below ground surface.
4. Water quality of samples from Monitoring Wells 1, 2, 3, 5 and 6 contained constituents below the Primary Drinking Water Standards.
5. The water sample from Monitoring Well 4 exceeded the Drinking Water Standards for Cadmium, Chromium, Nitrate, Chloride, Manganese, and Specific Conductance.

#### 10.0 RECOMMENDATIONS

A groundwater quality assessment program should be implemented as required by CFR 40 section 265.93(d)(2). This assessment program should include the following:

1. Additional soil borings/monitoring wells to potentially identify the source of the contamination.

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2. A discription of the horizontal and vertical extent of the chemical compounds in the groundwater.
3. An evaluation of the shallow aquifer characteristics by a pumping test.
4. The statagraphic thickness and continuity, as well as the permeability co-efficient of the upper aquiclude of the San Pedro Formation should be determined.
5. Determine other sources of the chemicals in the groundwater (i.e. prior owners, neighboring industries, etc.)

In additional to the assessment program, a concurrent extraction program should be implemented to remove the contaminated groundwater. Data being generated by the pilot extraction program now in progress can be utilized in the optimum design of the extraction program.

#### 11.0 REFERENCES

The references used in the preparation of this preliminary report include, but are not limited to, the following:

1. U.S.G.S Topographic map, Whittier Quadrangle, 1981.
2. DWR Bulletin 104, Appendix A.
3. Division of Water Rights, map, Location of Water Wells.
4. Watermaster Service Central Basin, Los Angeles County, July 1, 1981 - June 30, 1982.
5. Watermaster Service Central Basin, Los Angeles County, July 1, 1982 - June 30, 1983.

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6. DWR Bulletin 8.
7. DWR Bulletin 63, Appendix A.
8. Report on TCE Investigation, Los Angeles Regional Water Quality Control Board, April 1980.
9. Coastal Plain Ground Water Contours, Shallow Aquifer, Los Angeles Flood Control District, map no. 2-H240, Fall 1975.

## 12.0 LIMITATIONS

The conclusions and recommendations in this report are based on:

1. The 7 test borings performed at this site.
2. The observations of our field personnel.
3. The results of laboratory tests performed by Brown and Caldwell Laboratories.
4. The results of the land survey conducted by Combs/Rodriguez & Associates Land Surveying.
5. Measurements of groundwater elevations in the seven monitoring wells.
6. Referenced documents.

It is possible that variations in the soil or groundwater conditions could exist beyond the points explored in this investigation. Also, changes in the groundwater conditions found could occur at some time in the future due to variations in rainfall, temperature, regional water usage, or other factors.

The services performed by J. H. Kleinfelder & Associates have been conducted in a manner consistent with the level of care and



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skill ordinarily exercised by members of our profession currently practicing under similar conditions in the Los Angeles County Area. No other warranty, expressed or implied, is made.

Respectfully submitted,

J. H. KLEINFELDER & ASSOCIATES

Kenneth L. Durand  
Hydrogeologist

Randolph C. Harris  
Senior Hydrogeologist  
R.G. #3708

KLD:RCH:pb

**J. H. KLEINFELDER & ASSOCIATES****Q-1014-1.2****TABLE B - WATER ANALYSIS PERFORMED**

<b>Drinking Water Parameters</b>	<b>Parameters establishing Groundwater Quality</b>	<b>Parameters indicating Groundwater Contamination</b>
Arsenic Borium Cadmium Chromium Flouride  Lead Mercury Nitrate Selenium Silver  Endrin Lindane Methoxphlor Toxaphene 2,4-D  2,4,5-TP Silver Rodium Gross Alpha Coliform Bacteria	Chloride Iron Manganese Phenols Sodium  Sulfate	pH Specific Conductance TOC TOX

\* four samples

Additional Analysis as required by DOHS & RMQCB

Ammonia  
Sulfides  
Hexavalent Chrome  
Nickel  
Zinc

**TABLE C - SOIL ANALYSIS PERFORMED**

Nickel  
Zinc  
Chromium  
Copper

**ENI**

TABLE D

TABULATION OF SOIL DATA  
(mg/kg)

BORING # DEPTH	MW1		MW2		MW3		MW4		MW5		MW6A	MW6B	CAN TTEL
	10'	30'	10'	30'	10'	30'	10'	30'	10'	30'	10'	30'	
Copper	63	36	36	170/140	44	19	37	50	36	17	43	62	2500
Chromium	27	17	16	21/17	17	4.2	16	19	5.9	5.5	8.5	17	500
Nickel	29	16	21	77/65	18	nd <sup>5</sup>	21	25	6.6	5.1	12	21	2000
Lead	85	62	57	860/820	59	20	52	72	38	22	43	89	5000

Notes: ND5 = not detected at level indicated  
(i.e. ND5 is not detected at 5ppm)

\*\* The 30 foot sample of MW2 was retested  
170/140 = 1st analysis was 170ppm.  
2nd analysis was 140ppm.



TABLE E  
TABULATION OF WATER DATA (mg/l)

EPA Primary Drink Water Standards	Max Level (mg/l)	MW1	MW2	MW3	MW4	MW5	MW6
Arsenic	0.05	nd 0.0031	0.005	0.003	nd 0.0031	nd 0.003	nd 0.0026
Barium	1.0	nd 0.34	nd 0.34	nd 0.34	nd 0.34	nd 0.34	nd 0.3
Cadmium	0.01	nd 0.0002	nd 0.0002	nd 0.0002	0.78	nd 0.0002	nd 0.0002
Chromium	0.05	nd 0.0005	nd 0.0005	nd 0.0005	500	nd 0.0005	nd 0.0038
Fluoride	1.4-2.4	0.30	0.43	0.34	0.26	nd 0.10	0.34
Lead	0.05	nd 0.0046	nd 0.0046	nd 0.0046	nd 0.0046	nd 0.006	nd 0.0050
Mercury	0.002	nd 0.001	nd 0.001	nd 0.001	nd 0.002	nd 0.001	nd 0.001
Nitrate (NO <sub>3</sub> )	45	31	9.1	13	81	1.9	28
(N)	10	7.0	2.1	3.0	18	0.42	6.3
Selenium	0.01	0.0056	nd 0.007	nd 0.007	nd 0.0041	nd 0.007	0.010
Silver	0.05	nd 0.00023	nd 0.00023	nd 0.00023	nd 0.00023	nd 0.00023	nd 0.06
Endrin	0.0002	nd 0.0001	nd 0.0001	nd 0.0001	nd 0.0001	nd 0.0001	0.0001
Lindane	0.004	nd 0.00005	nd 0.00005	nd 0.00005	nd 0.00005	nd 0.00005	0.00005
Methoxychlor	0.1	nd 0.0003	nd 0.0003	nd 0.0003	nd 0.0003	nd 0.0003	0.0003
Toxaphene	0.005	nd 0.001	nd 0.001	nd 0.001	nd 0.001	nd 0.001	0.001
2,4D	0.1	nd 0.0025	nd 0.0025	nd 0.0025	nd 0.0025	nd 0.0025	nd 0.0005
2,4,5-TP Silver	0.01	nd 0.0005	nd 0.0005	nd 0.0005	nd 0.0005	nd 0.0005	0.0001
Gross Alpha	15pCi/l	2.4±3.3	4.2±2.8	4.6±2.8	1.7 ± 6.2	4.6±2.4	3.4±2.0
Gross Beta	50pCi/l	-15±19	-16±21	-4.1±21	-48 ± 42	-6.9±8.9	4.4±12

TABLE F  
TABULATION OF WATER DATA

Groundwater indicator  
Parameters

		MW1	MW2	MW3	MW4	MW5	MW6
pH	1st	7.3	7.0	7.3	6.3	7.3	7.6
	2nd	7.3	7.0	7.3	6.3	7.3	7.6
	3rd	7.3	7.0	7.3	6.3	7.3	7.6
	4th	7.3	7.2	7.5	6.3	7.3	7.0
	standard deviation	0.0	0.1	0.1	0.0	0.0	0.0
Average		7.3	7.0	7.4	6.3	7.3	7.6
Specific Conductance (Umhos/cm)	1st	2300	2400	1700	6400	1700	1400
	2nd	2300	2300	1700	6400	1700	1400
	3rd	2300	2300	1700	6400	1700	1400
	4th	2200	2300	1800	6400	1700	1400
	standard deviation	50	50	50	0	0	0
Average		2300	2300	1700	6400	1700	1400
TOC (mg/l)	1st	36	36	nd <sub>3</sub>	32	nd <sub>3</sub>	nd <sub>3</sub>
	2nd	46	29	nd <sub>3</sub>	38	nd <sub>3</sub>	nd <sub>3</sub>
	3rd	35	36	nd <sub>3</sub>	38	nd <sub>3</sub>	nd <sub>3</sub>
	4th	nd <sub>3</sub>	34	64	35	nd <sub>3</sub>	nd <sub>3</sub>
	standard deviation	0.7	3.3	32	2.9	0	0
Average		3.7	34	16	36	nd <sub>3</sub>	nd <sub>3</sub>
TOX (mg/l)	1st	nd 0.05	nd 0.05	0.18	nd 0.05	0.19	0.01
	2nd	nd 0.05	nd 0.05	0.17	nd 0.05	0.18	0.09
	3rd	nd 0.05	nd 0.05	0.16	nd 0.05	0.21	0.11
	4th	nd 0.05	nd 0.05	0.18	nd 0.05	0.19	0.11
	standard deviation	0	nd 0.01	0.01	0	0.013	0.01
Average		nd 0.05	nd 0.05	0.17	nd 0.05	0.19	0.10

TABLE G

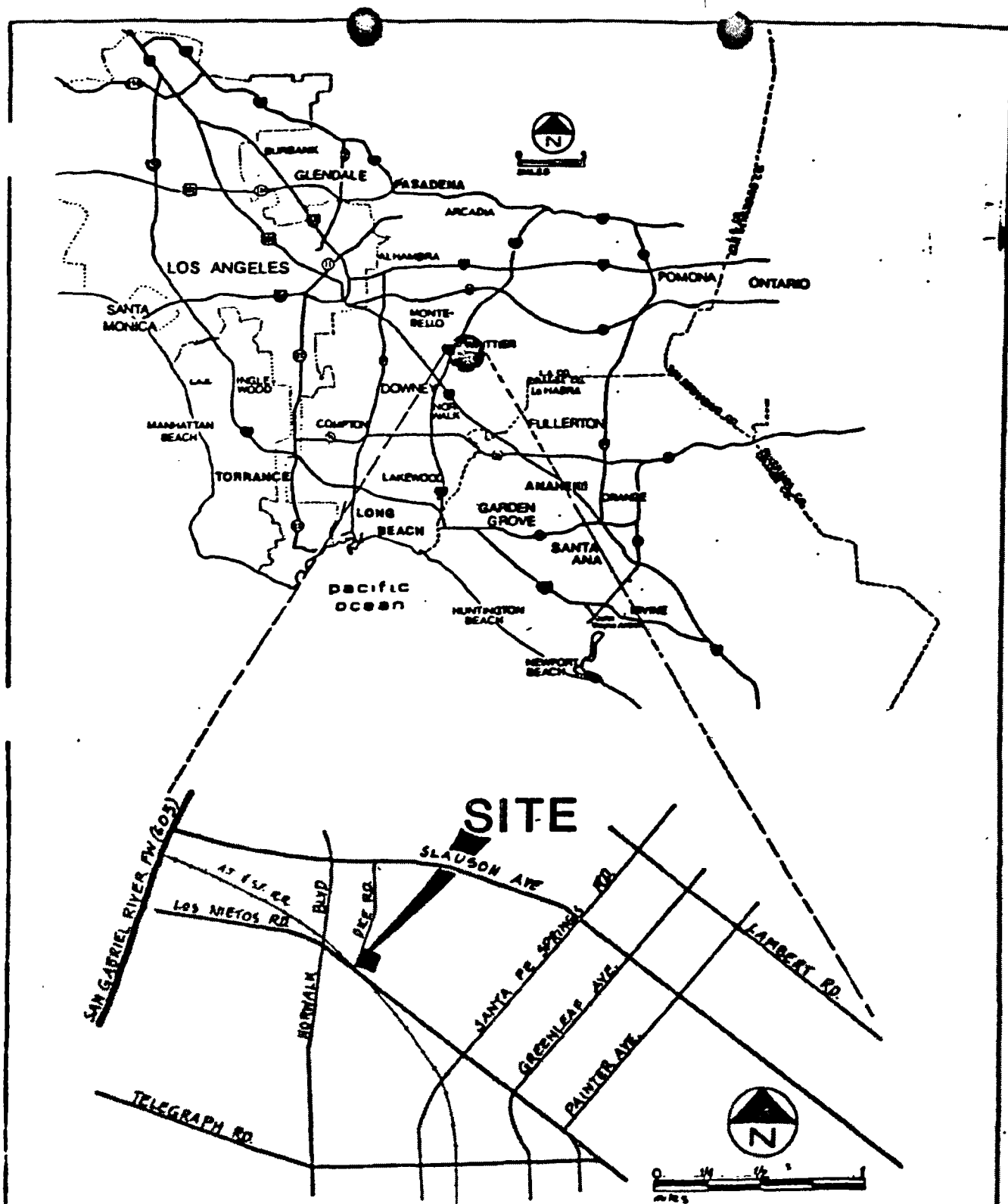
TABULATION OF WATER DATA  
(mg/l)Parameters Establishing  
Groundwater Quality

		MW1	MW2	MW3	MW4	MW5	MW6
Chloride	500mg/l	330	270	170	2300	2.0	79
Iron	0.3mg/l	nd <sub>0.1</sub>	0.32	nd <sub>0.1</sub>	nd <sub>0.1</sub>	nd <sub>0.1</sub>	0.22
Manganese	0.05mg/l	0.73	7.5	0.67	3.7	nd <sub>0.05</sub>	0.53
Phenols		nd <sub>0.05</sub>	1.3	0.09	nd <sub>0.05</sub>	0.52	nd <sub>0.1</sub>
Sodium		100	96	55	100	1.4	85
Sulfate	500mg/l	240	300	220	150	310	890

Compounds Requested  
by RWQCB & DONS

		(mg/l)					
Sulfide		nd <sub>1.0</sub>	nd <sub>1.0</sub>	nd <sub>1.0</sub>	nd <sub>1.0</sub>	nd <sub>1.0</sub>	nd <sub>0.1</sub>
Hexavalent Chromium		nd <sub>0.05</sub>	nd <sub>0.05</sub>	nd <sub>0.05</sub>	500	nd <sub>0.05</sub>	nd <sub>0.05</sub>
Nickel		0.0077	nd <sub>0.0040</sub>	nd <sub>0.0040</sub>	0.0053	nd <sub>0.0040</sub>	nd <sub>0.0040</sub>
Zinc	5.0mg/l	nd <sub>0.019</sub>	nd <sub>0.019</sub>	nd <sub>0.019</sub>	0.06	nd <sub>0.019</sub>	nd <sub>0.03</sub>
Ammonia Nitrogen		0.15	0.33	0.36	0.10	0.11	0.25
Copper	1.0mg/l	nd <sub>0.08</sub>	nd <sub>0.08</sub>	nd <sub>0.08</sub>	nd <sub>0.08</sub>	nd <sub>0.08</sub>	nd <sub>0.08</sub>

Notes: \* Secondary drinking water standard  
 nd0.05 = not detected at level indicated  
 (i.e. not detected at 0.05ppm)



I H KLEINFELDER & ASSOCIATES  
 (TECHNICAL CONSULTANTS • MATERIALS TESTING)



SOUTHERN CALIFORNIA CHEMICAL  
 SANTA FE SPRINGS, CA.

### LOCATION MAP

PLATE

**1**

PREPARED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

CHECKED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

PROJECT NO. Q 1014